The Problem of Inertia in a Friedmann Universe (D. Kazanas)

In this talk I will discuss the origin of inertia in a curved spacetime, particularly the spatially flat, open and closed Friedmann universes. This is done using Sciama's law of inertial induction, which is based on Mach's principle, and expresses the analogy between the retarded far fields of electrodynamics and those of gravitation. After obtaining covariant expressions for electromagnetic fields due to an accelerating point charge in Friedmann models, we adopt Sciama's law to obtain the inertial force on an accelerating mass m by integrating over the contributions from all the matter in the universe. The resulting inertial force has the form $F = -kma$ where the constant $k < 1 $ depends on the choice of the cosmological parameters such as $\Omega_{M},\ \Omega_{\Lambda}, $ and Ω_{R}. The values of k obtained suggest that inertial contribution from dark matter can be the source for the missing part of the inertial force.